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ART. VIII.—*Visit from Wadi Tor to Gebel Nakûs, جبل ناقوس, or the Mountain of the Bell, Peninsula of Mount Sinai. By*
LIEUTENANT NEWBOLD.

(Read 5th June, 1841.)

AFTER a night's refreshing bivouac on the sand, under the palm trees of Wadi Tor, we rose at sunrise on the 10th of June, 1840, mounted, and travelled slowly among some low sand hills in a northerly direction, almost parallel with the eastern shore of the Red Sea. As we emerged from the mouth of a small defile, the waters of this sacred gulf burst on our view; the surface marked with annular, crescent-shaped, and irregular blotches of a purplish red, extending as far as the eye could reach. They were curiously contrasted with the beautiful aqua-marine of the water lying over the white coral reefs. This red colour I ascertained to be caused by the subjacent red sandstone, and reddish coral reefs; a similar phenomenon is observed in the straits of Babel-mandeb, and also near Suez; particularly when the rays of the sun fall on the water at a small angle. The low hills of the defile were covered with fragments of brown, red, white, and black chert, many of them coated with a white mealy enduit, flattish and singularly honey-combed. Hillocks of a considerable size were often wholly composed of similar fragments. In a pass to the left, at the foot of some cliffs about fifty feet high, imbedded in a stratum of friable earthy sandstone, we observed a layer of fossil shells. The rock in many places is impregnated with oxide of iron, and contains thin veins of quartz resembling calcedony. From this place, our route lay along the shore of the Red Sea. High sandstone cliffs skirted the right of the path, in regular strata, dipping at an angle of 5°. E. 20 N.; direction S.S.E.

After about two hours' ride we arrived at the foot of a cliff, bulging out from the rest of the range, like an immense circular bastion from a curtain. On its surface were rudely engraved the names of sundry travellers, in Arabic, Greek, and modern European characters.

Here we dismounted; and, leaving our little caravan to the care of the Arab drivers, proceeded on foot towards the extremity of the range, which terminates in the singular bell-shaped hill called *Gebel Nakûs*, or the Mountain of the Bell.

By some Arabs, the range is called, after an anchorite who took

up his abode in the vicinity, "*Abu Suwaira*." Ten minutes' walk over sand and stones brought us to the base of *Gebel Nakús*. The apparent height is from 350 to 400 feet. On the western side, which faces towards the Red Sea, is a steep slope of a triangular form extending about eighty feet up the side of the hill, narrow at the top, but widening out as it approaches the bottom. This slope is bounded by low cliffs of sandstone on all sides except the base, and covered with a very fine quartzzy sand of a light reddish brown colour. The sand varies in depth from a few inches to five or six feet, according to the irregularity of the sandstone rocks which lie beneath it. It has evidently been conveyed to its present position, on the slope of the rock, by the strong prevailing westerly winds. Our Bedouin guide instantly pointed to this sandy slope, as the spot whence issue forth those mysterious Memnonian sounds, to which the mountain owes its appellation; and which the superstitious Arabs, as noticed by Burckhardt, believe to be produced by the bells of a subterraneous convent.

We strained our ears to catch a sound, but in vain: a deep silence, hardly broken by the faint murmurings of the wind, reigned over the singularly dreary and arid wastes around. The Bedouin, having desired us to wait at a rock at the foot of the slope, commenced its ascent, sinking knee-deep in the loose sand that covered it. Presently we heard a faint musical sound resembling the deeper chords of a violoncello at a distance, prolonged, and lightly touched. The Bedouin now descended; and, on my expressing some disappointment at the result, remarked with much phlegm, that the day was not propitious; but that, if we would come on the *Juma*, or Muhammedan Sabbath, we should hear the mountain strains to much greater advantage. My friend, Mr. Shute, of the Inniskillings, and myself, having now obtained some clue to the cause of the sounds, determined to put the guide's veracity to the test, and accordingly commenced the ascent, which we found fatiguing, from the depth and extreme fineness of the sand, and from the intense heat of the sun. Having reached the top, I seated myself at the base of the mural cliffs which crest the summit, and watched the course of the sand we had set in motion, as it passed downwards in undulating and gradually widening lines to the base. The particles of sand, displaced in the lower part of the slope, disturbed those immediately above and below them; and, more slightly, those on their sides; so that the disturbance of the upper layers of sand went on increasing on every side, somewhat resembling the effect produced on the surface of still water by dropping a stone into it.

About two minutes after the sand had been first set in motion, a faint rustling sound, as it rolled down, struck our ears; then the low, deep, distant, musical tone we had first heard, which generally became more and more distinct, and apparently nearer, in successive and fast repeated notes, whose sound partook of those of a deep mellow church or convent bell, and of the vibrations of a stringed instrument. On again disturbing the sand near the summit with my feet, the sounds took up a more treble and prolonged tone, resembling the wild strains of an *Æolian* harp, but gradually becoming deeper and louder, until at length they rivalled the continued rumbling of distant thunder, and fairly caused the sand on which I sat to tremble in distinct vibrations. This intensity of sound was produced a short interval after the whole surface of the sand had been set in motion from the summit to the base. The sensations imparted by the vibrations were most extraordinary; I can only compare them with those likely to be experienced by a person seated on the body of some enormous stringed instrument while a bow is slowly drawn over its chords. The greatest effect was produced by traversing the sand from right to left, and *vice versa*.

I descended to the base during the greatest intensity of the sounds, and awaited in silence their cessation, which took place with that of the motion of the sand, at the expiration of about a quarter of an hour.

Travellers have frequently attempted the explanation of this curious phenomenon. Some are of opinion that the sounds are caused by the sand's motion over hollow rocks; others imagine them to proceed from the sand falling into cavities; some again suppose them to have their origin in subterranean volcanoes; and a few have thought that similar sounds may be produced by the action of the wind on the thin elastic plates of mica which abound in granite and gneiss. The notion of the Arabs, that the sounds are those of the bells of a subterraneous convent, has doubtless been derived from the idle tales of the monks of Mount Sinai, who declared to me that they had never been heard, until after the destruction of one of their convents near Tor, and the death of the Forty Martyrs.

With regard to the first and third of these opinions, I can only observe, that on a careful examination of the rocks over which the sand rolled, they proved to be of a massive whitish sandstone or grit, of a granular texture, imbedding pebbles of quartz, and entirely free from caverns, or holes of any magnitude. No volcanic rocks, nor traces of extinct volcanoes, were found in the vicinity.

Erratic fragments of porphyry, granite, greenstone, and melaphyre, evidently transported from the lofty ranges of Sinai in the interior, occurred strewed on the surface of the desert not far distant. Were the sounds volcanic, they would be absolutely independent of the motion of the sand, which I shall have occasion to notice as an indispensable condition to their production. The idea of their being caused by sand falling into the cavities of the rocks appears to me to be nearly as satisfactory as the tale of the subterraneous bells. Sand, in falling, produces nothing beyond a dull rustling noise, as may be readily proved by experiment. With regard to the hypothesis of, wind acting on the thin and elastic plates of mica, I may remark, that I could not detect a single plate of this mineral in the rocks of the locality, which were all of a sandy and calcareous character. I am not, however, prepared to deny the possibility of sounds being produced, under certain conditions, in the crevices of rocks of granite, gneiss, &c., which abound in mica.

My own ideas as to the cause of the phenomenon of the Mountain of the Bell, coincide in a great measure with those of Lieutenant Wellsted; who has expressed his opinion, that its explanation is intimately connected with the agitation of the sand. The inclination of the slope, down which the sand falls, is nearly that at which sand lies, when poured down in a heap. It rolls down this slope, after having been disturbed, in a westerly direction; the surface of the subjacent sandstone rocks is uneven and step-like. In falling, the sand collects into waves, about an inch or two inches high, resembling those of a thick liquid flowing slowly down an inclined plane. These waves widen out as they approach the base of the slope, and acted upon by the wind, which was at the time of my visit blowing pretty strongly from the N.W., nearly at an angle of 45° with the course of the sand, form into festoon-like curves. The sounds produced on first disturbing the sand near the summit of the plane, were, as before remarked, of a treble nature; but gradually deepened, and became graver and louder, as the undulations lengthened on their way downwards to the base; apparently on the principle of the difference of sounds produced by the strings, of different lengths, of a musical instrument.

This effect was increased by the peculiar shape of the plane down which the sand glided, which, from the circumstances of its being narrow at top and broad at the base, admitted of the gradual extension or widening of the waves of sand; or, if I may so express myself, the lengthening of the strings, and the consequent deepening of the strains, of this great natural *Æolian harp*.

That the sounds are caused principally by the motion of the sand is further proved by the perfect stillness of the locality, so long as the sand remains undisturbed; by the gradual increase, diminution, and cessation of the sounds with those of the motion of the sand, and by their being inaudible in wet weather, when the surface is consolidated, as observed by Lieutenant Wellsted. That the action and direction of the wind is a favourable, if not a necessary, condition, is proved by the sounds being faint, according to the testimony of my Bedouin, in calm weather, and sometimes inaudible; such was probably the case on the occasion of Lieutenant Wellsted's first unsuccessful visit. Further information, however, is desirable on these points; and it would be interesting to visit the locality during the prevalence of an easterly wind. I hardly need remark, that the N.W. winds blow with so much violence occasionally, as to disturb the sand, and thus produce the sounds without the aid of man. It would also be useful to take careful relative measurements of the locality, to ascertain the force and direction of the wind most favourable for producing the sounds, with a view of constructing a model on a small scale, from which similar effects might probably be produced artificially, and the curious question, regarding the possibility of moving lines of loose sand producing, under any circumstances, musical sounds, decided beyond the shadow of a doubt. It is not a little singular that *Gebel Nakús* should be, as far as I am aware, the only known spot on the globe where the necessary conditions exist for producing those remarkable sounds, although I have seen several localities in Arabia, Egypt, and Spain, where loose sand has been accumulated on the sides of rocks in an apparently similar manner. But it must be remarked at the same time, that opportunity did not admit of a careful comparative examination of these localities.

A short notice of a phenomenon apparently depending on similar causes to those which produced the sounds described in the foregoing paper, was inserted by Captain (now) Sir Alexander Burnes, in the Bengal Asiatic Journal of April, 1838. As few copies of that excellent periodical are to be found in England, it has been thought that an extract from Sir Alexander's paper might be interesting.—EDITOR.

“In the vicinity of *Cabúl* there is a phenomenon similar to what occurs at *Jabal Nakous*, or the Sounding Mountain, near *Tor*, in the Red Sea. It is called *Reg-Ruwan*, or the Moving Sand, and

is thus described by the Emperor BABER. 'Between these plains there is a small hill in which there is a line of sandy ground, reaching from the top to the bottom of the hill. They called it *Khwdja Reg-Ruwan*. They say that in the summer season the sound of drums and nagarets issues from this sand.' The place has been seldom visited, being in the *Kohistan*, or troubled part of the country; but the power of the present Chief of *Cabul* has subdued the rebellious tribes near, and an opportunity was thus afforded us of visiting it, which we did in October last.

"The description of BABER above given, though it appears marvellous, is accurate. *Reg-Ruwan* is about forty miles north of *Cabul* towards *Hindu Kosh*, and near the base of the mountains. Two ridges of hills, detached from the rest, run in and meet each other; at the apex of this a sheet of sand, as pure as that on the sea shore, with a slope of about forty degrees, forms the face of a hill to its summit, which is about 400 feet high. When this sand is set in motion by a body of people, who slide down it, a sound is emitted. On the first trial we distinctly heard two loud, hollow sounds, such as would be given by a large drum. On two subsequent attempts we heard nothing, so that, perhaps, the sand requires to be for a time settled before the curiosity is displayed. There is an echo in the place, and the inhabitants have a belief that the sounds are only heard on Friday, when the saint of *Reg-Ruwan*, who is interred hard by, permits! The locality of the sand is remarkable, there being none other in the neighbourhood. *Reg-Ruwan* faces the south, but the wind of *Purwan* (*badi Purwan*) blows from the north for the greater part of the year, and has probably deposited it by an eddy. Such is the violence of this wind, that all the trees in the neighbourhood bend to the south; and a field, after a few years, requires to be recleared of the pebbles and stones which the loss of soil lays bare. The mountains here are generally composed of granite or mica, but at *Reg-Ruwan* we had sand-stone, lime, slate, and quartz."
